

## MULTI-PASS PHASE TRACKING LOOP WITH REWIND OF FUTURE WAVEFORM IN DIGITAL COMMUNICATION SYSTEMS

### ABSTRACT OF THE DISCLOSURE

A demodulator for demodulating a QPSK modulated signal waveform in a data communication system, has a phase tracking loop tracking the phase of said QPSK modulated signal waveform and having an inner block decoder configured to decode a set of vector pairs of the modulated signal waveform at a decode rate to generate associated codewords and phase estimates. A group of data symbols consisting of the first data symbols of the QPSK modulated signal waveform are stored until a future waveform is received and then run backwards through the phase tracking loop concurrently with the data from the future waveform. An outer block decoder receives the associated codewords generated by said inner block decoder and utilizes and corrects only codewords associated with symbols after and including the group of data symbols consisting of the first data symbols of the QPSK modulated signal waveform.